RESPONSE UNDER 37 C.F.R. § 1.116
EXPEDITED PROCEDURE
EXAMINING GROUP 1714

OFFICIAL

PATENT
Docket No. HOE97/F143

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Sievers et al.	Group Art Unit:	1714
Application No.:	09/730,463	Examiner:	Wyrozebski Lee, K. I.
Filed:	December 5, 2000	Confirmation No.:	8152

For: **NANOPOROUS INTERPENETRATING ORGANIC-INORGANIC NETWORKS**

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AMENDMENT AND RESPONSE TO OFFICE ACTION

Sir:

In response to the Final Office Action mailed February 5, 2004, Applicants respectfully request reconsideration of the above-identified application in view of the following amendments and remarks.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 9 of this paper.

AMENDMENTS TO THE CLAIMS

1. (Currently amended) Process for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by:

(1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds;

(2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and

(3) drying the gel to produce a material with interpenetrating organic and inorganic networks on a scale of no more than 100 nm.

2. (Previously presented) Process according to Claim 1, characterized in that the organic polymers, polymer precursors, or mixtures thereof are based on formaldehyde or formaldehyde-containing resins, polyvinyl alcohol, or poly(meth)acrylates.

3. (Previously presented) The process according to Claim 1, characterized in that sodium silicate, laminar silicates or silicic acids are used as the silicon dioxide compounds.

4. (Previously presented) Process according to Claim 1, characterized in that fillers in the form of particles, fibers, fabrics, nonwovens, mats, or mixtures thereof or functional substances such as dyes, indicators, biomolecules, receptors or mixtures thereof are added to the aqueous solution.

5. (Previously presented) Process for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by

(1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds;

(2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and

(3) drying the gel,

characterized in that the water in the materials is replaced by an organic solvent before drying, and in that the silica gels are modified organically by silylation.

6. (Previously presented) Process for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by

(1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds;

(2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and

(3) drying the gel,

characterized in that drying is conducted under conditions which lead to a composite material, where the composite material can then be calcined.

7. (Previously presented) Process according to Claim 1, characterized in that drying is conducted under conditions which lead to a xerogel or to an aerogel.

8. (Previously Presented) Materials with organic and inorganic networks which interpenetrate on a scale of no more than 100 nm and are obtained by a process according to Claim 1.

8. (Original) Aerogel consisting of organic and inorganic networks interpenetrating on a scale of no more than 100 nm with a density of no more than 0.6 g/cm^3.

10-11. (Cancelled)

12. (Previously presented) Molded article consisting of material according to Claim 8.

13. (Previously presented) Process for the production of molded articles according to Claim 12, characterized in that the aqueous solutions or dispersions are introduced into a mold and in that a gel is then formed and dried.

14. (Cancelled)

15. (Previously presented) Molded article consisting of material according to Claim 9.

16. (Previously presented) Process for the production of molded articles according to Claim 15, characterized in that the aqueous solutions or dispersions are introduced into a mold and in that a gel is then formed and dried.

17-19. (Cancelled)

20. (Previously presented) A process of producing materials, the process comprising:

(a) providing organic and inorganic networks which interpenetrate on a scale of no more than 100 nm, the organic and inorganic networks which interpenetrate on a scale of no more than 100 nm produced by a method comprising:

(1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds,

(2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks, and

(3) drying the gel;

(b) producing materials using the gel, the materials comprising thermal insulation properties, sound absorption properties, adsorption properties and/or barrier properties against water and/or organic solvent.

21. (Previously presented) The process of claim 20 in which the gel is dried under conditions which lead to a composite material.

22. (Previously presented) A process of producing materials, the process comprising:

(a) providing organic and inorganic networks which interpenetrate on a scale of no more than 100 nm, the organic and inorganic networks which interpenetrate on a scale of no more than 100 nm produced by a method comprising:

(1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds,

(2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks, and

(3) drying the gel;

(b) producing materials using the gel, the materials comprising thermal insulation properties, sound absorption properties, adsorption properties and/or barrier properties against water and/or organic solvent,

in which the gel is dried under conditions which lead to a composite material and in which the produced materials are granulates or molded ceramic articles.

23. (Previously presented) The process of claim 20 in which the gel is dried under conditions which lead to a xerogel or an aerogel.

24. (Previously presented) The process of claim 23 in which the produced materials comprise molded articles.

25. (Previously presented) A process of using materials for medical diagnostics and sensor technology, the process comprising:

(a) providing organic and inorganic networks which interpenetrate on a scale of no more than 100 nm, the organic and inorganic networks which interpenetrate on a scale of no more than 100 nm produced by a method comprising:

(1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds,

(2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks, and

(3) drying the gel;

(b) producing materials comprising the gel in conjunction with dyes, indicators, receptors, enzymes and/or biomolecules; and

(c) using the materials for medical diagnostics and sensor technology.

26. (Previously presented) The process of claim 25 in which the materials have a density of no more than 0.6 g/cm^3.

27. (Previously presented) The process of claim 25 in which the materials comprise a molded article or surface coating.

28. (Previously presented) The process of claim 27 in which the materials have a density of no more than 0.6 g/cm^3.

29. (Previously presented) Process for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by:

(1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds, wherein the organic polymers, polymer precursors, or mixtures thereof are formaldehyde or formaldehyde-containing resins, polyvinyl alcohol, or poly(meth)acrylates;

(2) changing the pH of the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and

(3) drying the gel.

30. (Previously presented) Process for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by:

(1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors, or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds, wherein the organic polymers, polymer precursors, or mixtures thereof are formaldehyde or formaldehyde-containing resins, polyvinyl alcohol, or poly(meth)acrylates;

(2) thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and

(3) drying the gel.

31. (Previously presented) Process for the production of materials with interpenetrating organic and inorganic networks on a scale of no more than 100 nm by:

(1) mixing aqueous solutions or dispersions of organic polymers, polymer precursors,

or mixtures thereof which are capable of forming polymer networks in the aqueous phase with silicon dioxide compounds, wherein the organic polymers, polymer precursors or mixtures thereof are selected from the group consisting of polyethylene glycol, carboxymethylcellulose, polyamides, polyvinylamines, bile acid homopolymers, bile acid copolymers, bile acid oligomers, melamine resins, phenolic resins, resorcinol resins, melamine-formaldehyde resins, resorcinol-formaldehyde condensates and polyacrylic acids;

(2) changing the pH of and/or thermally treating the aqueous solution or dispersion to form a gel consisting of interpenetrating organic and silica gel networks; and

(3) drying the gel.

32. (Previously presented) Surface coating consisting of material according to Claim 8.

33. (Previously presented) Process for the production of surface coatings according to Claim 12, characterized in that the aqueous solutions or dispersions are applied to a surface and in that a gel is then formed and dried.

34. (Previously presented) Surface coating consisting of material according to Claim 9.

35. (Previously presented) The process of claim 23 in which the produced materials comprise surface coatings.

36. (Previously presented) Process for the production of surface coatings according to Claim 34, characterized in that the aqueous solutions or dispersions are applied to a surface and in that a gel is then formed and dried.